

# Ha-VIS FE SFP Transceiver SM L15



## Ha-VIS FE SFP Transceiver SM L15

Fast Ethernet

for Duplex LC connector, Singlemode Cable, 15 km

### Features

- 1310 nm FP LED
- Data Rate: 155 Mbit/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Duplex LC Connector
- Compliance with 100Base-FX of IEEE 802.3u Standard
- Compliance with FDDI PMD Standard
- Compliance with ATM Standard

### General description

The Ha-VIS FE SFP Transceiver SM L15 is the high performance and cost-effective module for serial optical data communication applications specified for single mode of 155 Mbit/s. It operates with +3.3 V power supply. The module is intended for Singlemode fiber, operates at a nominal wavelength of 1310 nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated digital diagnostics functions via an I2C serial interface.

The module is a duplex LC connector transceiver designed to provide an ATM/SONET OC-3/SDH STM-1 compliant link for 155 Mbit/s intermediate reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

Identification

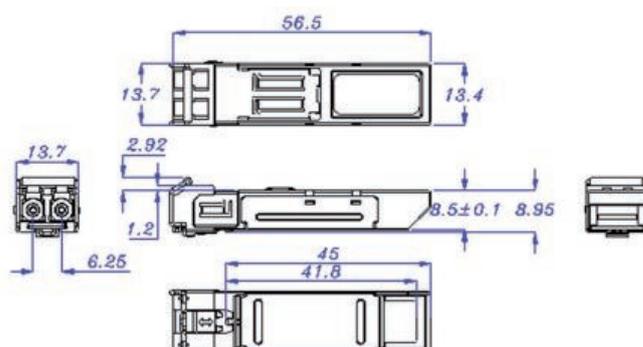
Part number

Drawing

Dimensions in mm

Ha-VIS FE SFP Transceiver SM L15

20 76 020 0300



## Technical characteristics

### Applications

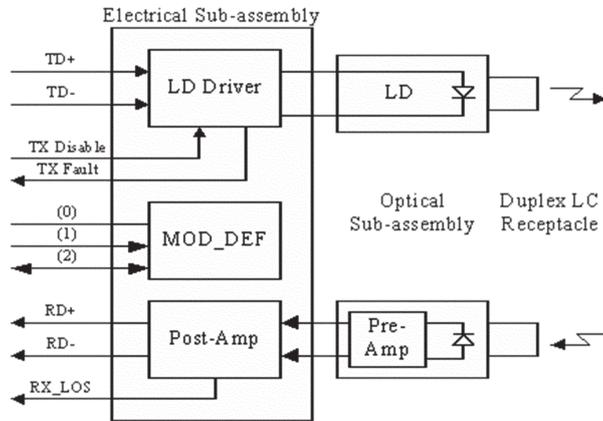
- Fast Ethernet
- FDDI
- ATM/SONET OC-3/SDH STM-1
- Singlemode fibre links
- Optical-Electrical Interface Conversion

### Ethernet Interface - Fibre Optic

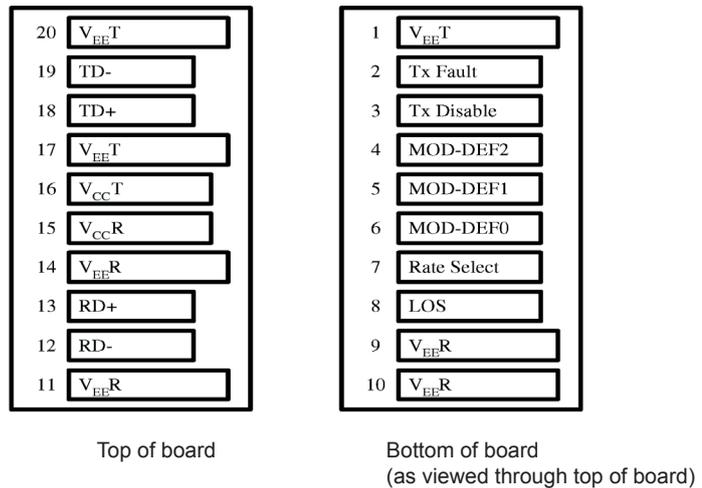
Cable types acc. to IEEE 802.3	Singlemode fibre, 1310 nm; 9 / 125 $\mu$ m
Data rate	155 Mbit/s
Maximum cable length	15 km
Sensitivity	$\leq$ -34 dBm
Wave length	1310 nm FP
<b>Transmitter</b>	
Output power	-15 ... -8 dBm
Extinction Ratio (min)	8.2 dB
Center wave length	1263 ... 1360 nm
Center wave length (typ.)	1310 nm
Spectral width (FWHM) (max)	3 nm
Optical rise time (10 % ... 90 %) (max)	2.0 ns
Optical fall time (10 % ... 90 %) (max)	2.0 ns
Output eye	compliant with ITU recommendation G.957
<b>Receiver</b>	
Maximum input optical power (min)	-3 dBm
Receiver sensitivity (max)	$\leq$ -34 dBm
Operating wave length	1100 ... 1600 nm
Loss of Signal - asserted ( $P_A$ ) (min)	-45 dBm
Loss of Signal - deasserted	$0,5 + P_A$ ... -33 dBm
Loss of Signal - hysteresis	0.5 ... 4 dB
<b>Timing characteristics</b>	
TX_DISABLE Assert Time (max)	10 $\mu$ s
TX_DISABLE Negate Time (max)	1 ms
Time to initialize, include reset of TX_FAULT (max)	300 ms
TX_FAULT from fault to assertion (max)	100 $\mu$ s
TX_DISABLE time to start reset (min)	10 $\mu$ s
Receiver Loss of Signal Assert Time (max)	
off to on	100 $\mu$ s
on to off	100 $\mu$ s

## Technical characteristics

Block diagram of transceiver



Pin assignment diagram of transceiver



Pin	Symbol	Functional description
1	VeeT	Transmitter ground
2	TX Fault	Transmitter Fault Indication (not connected)
3	TX Disable	Transmitter Disable - module disables on high or open
4	MOD-DEF(2)	Module Definition 2 - two wire serial ID interface
5	MOD-DEF(1)	Module Definition 1 - two wire serial ID interface
6	MOD-DEF(0)	Module Definition 0 - grounded in module
7	Rate Select	Not connected
8	LOS	Loss of signal
9	VeeR	Receiver ground
10	VeeR	Receiver ground

Pin	Symbol	Functional description
11	VeeR	Receiver ground
12	RD-	Inverse received data out
13	RD+	Received data out
14	VeeR	Receiver ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter ground
18	TD+	Transmitter data in
19	TD-	Inverse transmitter data in
20	VeeT	Transmitter ground

## Technical characteristics

### Power Supply

Power supply (Vcc)	0...6 V DC
Operating voltage and SD output	3.3 V TTLAC/AC
Permissible range	3.1 V to 3.5 V
Data input voltage swing	400 ... 1600 mV

### Transmitter

Transmitter supply current (max)	200 mA
Tx Transmitter Disable Input voltage - low	0 ... 0.8 V
Tx Transmitter Disable Input voltage - high	2.0 V ... Vcc
Tx Transmitter Fault Output voltage - low	0 ... 0.8 V
Tx Transmitter Fault Output voltage - high	2.0 V ... Vcc

### Receiver

Receiver supply current (max)	100 mA
Receiver Data Output differential voltage	0.4 ... 1.3 V
Rx LOS Output voltage - low	0 ... 0.8 V
Rx LOS Output voltage - high	2.0 V ... Vcc
MOD_DEF (1), MOD_DEF (2) - low	-0.6 V ... Vcc x 0.3
MOD_DEF (1), MOD_DEF (2) - high	Vcc x 0.7 ... Vcc + 0.5

### Design features

Housing type	metal housing
Dimensions (W x H x D)	13.7 mm x 8.95 mm x 56.5 mm

### Environmental conditions

Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C

### EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN 55 022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

### Eye safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60 825-1.

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